consideration of the cases narrated, and as such we quote them in full for the benefit of our readers.

"1. This operation is a successful one.

"2. Though not a trifling operation, it is not dangerous.

"3. In the operative procedure the points deserving attention are, the *incisions* which should be arranged for the free escape of pus. The *periosteum*, which is not to be detached from the muscles, and which, after incision, is best torn out from the rugous inequalities of the bony extremity, and subsequently attached by suture or not. The excision of at least a quarter of an inch of sound cylindrical *bone*, besides the irregular and tapering end. The *wire* which should not be twisted too tightly, lest it break out of the bone.

"4. The wire may be left in place indefinitely without danger of necrosis; and usually until union has unequivocally taken place; a period of from two to six months.

"5. Burrowing pus is to be evacuated, when it approaches the surface, so that the wound will insure it free and permanent exit.

"6. The patient is to be invigorated by such food as he bears, fresh air, and other stimulus if required.

"7. The operation may be repeated if it fails, but only after several months' interval."

Dr. Bigelow's pamphlet concludes with two cases introduced to illustrate the question of the periosteal reproduction of bone. The first is a case of excision of the elbow-joint in which the condyles of the humerus were in some degree reproduced, though it afterwards was found necessary to amputate the arm, the patient dying eventually of pulmonary consumption. In the other case, one of rhinoplastic operation, the periosteum was dissected from the forehead with the frontal flap. No bone was produced in the new nose, while the denuded portions of the frontal bone became necrosed, and eventually exfoliated. The case of excision of the elbow is illustrated by three wood-cuts, which represent sufficiently well the appearances described.

We shall certainly employ Dr. Bigelow's operation ourselves if an occasion should be presented, and we hope that it will receive an extended trial at the hands of the profession; for in the hands of its originator it has undoubtedly been very successful, and it seems to us to promise more upon theoretical grounds than any other operation with which we are acquainted.

J. A., Jr.

Art. XXII.—*The Preparation and Mounting of Microscopic Objects.* By Thomas Davies. 12mo. pp. 144. New York: William Wood & Co.

This little work, published without a date, contains more useful information for the general microscopist than would be inferred from a superficial examination. Pretending to be principally made up of selections of the most approved methods from different sources, many of which are quite inaccessible to the advanced worker, as well as to the beginner, the ground is very thoroughly examined.

Chapter I. is devoted to the *apparatus* required in mounting, including the various forms of cells adapted to different objects and different modes of illumination, and to the cements and varnishes employed in making certain of these and cementing down their glass covers. It will only be necessary to recall one or two useful points less generally known. One of these is, the addition to varnishes employed in making shallow cells, of a solution of India-rubber in naphtha, with a view of diminishing an unfortunate tendency, which many have, to crack, or "chip," as the author expresses it. A few drops of such solution, or, what we have found equally useful and more accessible, of a solution of India-rubber in *benzine*, will diminish such tendency. This also gives the cells an elasticity by which they are permitted to accommodate themselves to the expansion or contraction of their contents, which is extremely important under certain circumstances. It should be added until a drop allowed to fall upon a glass slide, when dry, recovers itself when "pitted" by pressure with the finger. When added to "Brunswick black," which is composed of asphaltum, linseed oil, and turpentine, very nearly the "black Japan" varnish of Mr. Davies, it forms a most excellent cement for making cells, and fastening down their glass covers. This is the favourite of Dr. Beale and others. We are informed by an experienced manipulator of this city, Dr. J. G. Hunt, that a solution of sugar is also useful for diminishing this tendency to crack or chip, and as it is so easily obtained, recommends itself. The difficulty which exists in causing paper labels to adhere to glass slides by means of the ordinary solution of gum arabic is well known. This is entirely obviated by adding a drachm of loaf sugar, or a few drops of glycerine, according to Mr. Davies, to every ounce of an ordinary strained solution.

Chapter II. teaches how to prepare and mount objects *dry*. This includes not merely general directions, but special, for different kinds of objects. Much of the chapter is devoted to the collection and preservation of fresh diatoms and foraminifera, and much valuable information, otherwise inaccessible, is given. Nor are other objects omitted. Structures of plants, scales of insects, blood, certain crystals, raphides, scales of fishes, etc., are all included. We are very properly informed that many of these objects, to be studied, should be mounted as well in preservative solutions or in balsam. This is especially the case where it is desired to study the internal structure of objects, when they should be mounted in substance of a specific gravity approaching their own. Such substance, penetrating their anterior, renders them more transparent and reveals their structure.

Chapter III. treats of *mounting in Canada balsam.* The two important objects to be attained are, first, that the object should be quite dry, and second, to get rid of air-bubbles. The first is attained by ordinary means, and the second by soaking, or, if necessary, boiling in turpentine. Discrimination must, of course, be exercised in the use of heat, as some structures are injured by it. The principle is simple—the turpentine insinuates itself and displaces the air, and as balsam is soluble in turpentine, it, in turn, mingles with the latter. Then the object, freed by draining from superfluous liquid, is "carefully laid upon, or, if possible, thrust into the balsam," which is placed upon the slide by a "blunt-pointed glass rod." To this a slight heat is previously applied, which will cause any air bubbles to rise to the surface of the drop, whence they may be removed by a heated needle. The thin glass cover is likewise to be warmed and allowed to fall upon the balsam, driving a small wave before it, thus expelling the bubbles which remain. In these instances no special cell is required, the balsam forming at once the preservative, the cell, and the cement. When the object is of such thickness as to require a cell, this should be filled with balsam in the manner described by T. S. Ralph, in the *Microscopic Journal* (what date or number is unmentioned). "Fill the cell with clear spirit of turpentine, and place the specimen in it, and have ready some balsam, just fluid enough to pour out of the bottle when warmed by the hand; pour this on the object at one end, and gradually inclining, allow the spirit of turpentine to flow out on the opposite side of the cell till it is full of balsam; then take up the thin glass cover, and place carefully upon it a small streak of Canada balsam from one end to the other. This, if laid on the cell with one edge first, and then gradually lowered until it lies flat, will drive all the air before it, and prevent any bubbles from being included in the cell."

No mention is made of the "artists' colour tubes" for holding and dropping Canada balsam. These furnish decidedly the most convenient means, as the smallest or largest drop may be obtained without the aid of a glass rod, by which the balsam is liable to be conveyed to other situations where it is not wanted.

No reference is made to the method of mounting moist tissues in Canada balsam, a subject of no little importance, as all tissues naturally bathed by fluids must necessarily be altered by the process of drying. This is accomplished, as directed by Beale, by first soaking the moist tissue in an alcoholic solution of acetic acid or caustic soda, which does not alter the albuminous materials, the soda and acetic acid counteracting the coagulating properties of the alcohol. After the tissue is well saturated, the alcoholic solution, now containing a little water from the specimen, is changed for some fresh fluid, and after it has been allowed to soak in this for some time, it is placed in a solution of Canada balsam in ether. This is also changed once or twice for fresh portions of the ethereal solution, when the specimen may be taken out and placed upon a glass slide. A little fresh balsam may now be added, and the specimen mounted permanently. Although Canada balsam will not mingle with water, ether will, alcohol again mixes with ether and Canada balsam with ether. The alcohol removes the water, the ether replaces the alcohol, and the Canada balsam, soluble in ether, may thus be introduced into the interstices of the tissue.

Chapter IV. on *preservative fluids*, etc., *particularly where cells are used*, treats briefly of these, and the cells mostly used in this branch of microscopic mounting. Of the former, modified formulæ are required for different structures, but the principal are those of which glycerine is the basis; as glycerine and camphor water, glycerine jelly, consisting of glycerine, gelatine, and white of egg, glycerine and gum, consisting of pure gum arabic, glycerine and water, each an ounce, and arsenious acid 1½ gr. The naphtha and creasote solution, so highly recommended by Beale, is not referred to, and of carbolic acid, it is said, it has not been known long enough to warrant any opinion of its merits. But of this we are told in the last edition of *The Microscope in Medicine*, "the preservative qualities of this substance are now well known. A solution for mounting and preserving tissues may be made by adding 100 parts of distilled water to 1 part carbolic acid. Both animal and vegetable tissues may be preserved in this medium." Dr. Beale further adds: "Upon the whole, I am still of opinion that the strongest glycerine and glycerine jelly are the most advantageous media for preserving animal tissues, and carbolic acid and creasote fluid for the preservation of various specimens, for which a fluid possessing the highly refracting properties of glycerine is not suitable." All specimens should be previously soaked for some time in one or two changes of the preservative in which they are to be mounted.

We have ourselves used glycerine and camphor water generally in the proportion of 1 to 2, almost exclusively for animal tissues, and found it eminently satisfactory. So far as tested, Dr. J. G. Hunt finds a solution of acetate of alumina most suitable for vegetable tissues.

A statement of Dr. Carpenter is quoted by Dr. Davies which is worth recollecting. It is with reference to the solvent power of glycerine for carbonate of lime. The writer lost a useful specimen from ignorance of this fact.

Chapter V. is on *sections, and how to cut them*, with some remarks on dissection. In connection with the former are the usual details necessary for this difficult and tedious process, for which we must refer to the book. Some further details should be given in regard to the processes of hardening and preparing animal tissues for section. We believe it rarely advisable to make sections of dried animal tissues, as such specimens must be somewhat altered by the process of drying. Though the *section-cutter* for *vegetable* structures, and *Valentine's knife* for *animal* tissues are very convenient; yet, for the former, a sharp razor is admirable, and we have made by far the most satisfactory sections of animal tissues, at least for immediate examination, by the small scissors curved "on the flat." The remarks on dissection are principally confined to the lower animal organisms.

Chapter VI., on *injection*, includes an account of the apparatus required, with the manipulations necessary for making opaque and transparent injections. These are fully treated, and, indeed, it appears to us, unnecessarily so as regards opaque injections. So confident are we of the superiority of the transparent injections, that we believe they will before long entirely supersede the opaque. Their advantages are more particularly referred to in a notice of Beale's Microscope in Clinical Medicine, in the July (1867) number of this Journal.

Chapter VII., *miscellaneous*, is occupied with such subjects of interest to the microscopist as cannot conveniently be classified. Among these are the circulation of the blood, the rotatory motion of the fluid in many plants, micro-photography, etc. The first is best studied in the web of a frog's foot, wing of a bat, and tail of a fish, or tadpole not too old; the second in the nitellæ, the vallisneria spiralis, the anacharis alsinastrum, and in the chara vulgaris. In the first, third, and fourth no preparation is required except plucking a part from a stem and laying it upon a slide, but the vallisneria requires to be cut in sections. The remarks on photomicrography refer only to the production of minute pictures which serve as objects for the microscope. We can only conceive these to be interesting as toys, but must admit that they alone come, strictly speaking, within the province of the "preparation and mounting" of objects. But as the photography of magnified objects has become of so much importance, and the only published directions for making them appear in English works, we should certainly have excused the author for overstepping the limits of his title, and introducing some account of them, with the method of obtaining them. It might not inappropriately be stated, in this connection, that we are aware of no published account, except what has appeared in English journals (*Intellectual Observer*, July and August, 1866, and *Quarterly Journal of Microscopic Science*, April, 1867) of the very successful efforts which have been made in this direction of microscopic inquiry, under the auspices of the Medical Department of the Army of the U. S. We confess to feeling somewhat jealous of the attention shown our transatlantic brethren by our countrymen engaged in these researches, while Americans are compelled to receive the information at second hand.

In concluding this notice of Mr. Davies' hand-book, we feel glad to say what has already been intimated, that it will prove a valuable guide to the manipulator. Yet we cannot but say of it, also, that there is an absence of systematic arrangement in its subjects treated, which does not, it is true, impair the utility of so small a book as it would a large one, but is equally objectionable in both. The value of books of this class is also greatly enhanced by illustrations, of which this little volume has none. Perhaps the description of the "universal stand," pp. 25 and 26, would be more intelligible by the aid of a diagram. As it stands, we confess our inability to form any conception of a universal stand from reading the description there given. J. T.

ART. XXIII.—*Micro-chemistry of Poisons, including their Physiological, Pathological, and Legal Relations; adapted to the Use of the Medical Jurist, Physician, and General Chemist.* By THEO. G. WORMLEY, M. D., Prof. of Chemistry and Toxicology in Starling Medical College, and of Natural Sciences in Capital University, Ohio. With seventy-eight illustrations upon steel. 8vo. pp. 668. New York: Baillière Brothers, 1867.

IN the preparation of the above work, no ordinary amount of research and experimental investigation must have been demanded, for it was necessary to gather information from every source, and to make careful inquiry in order to ascertain the character of that which is accepted or confirmed, and presented to the reader as worthy of trust and confidence. The mere compiling into an accessible form the scattered observations that are constantly accumulating on all hands merits high praise, and would alone be a boon of much value; but when, in addition to this, there is adduced in confirmation numerous careful, accurate, and well devised experiments in which the results are brought down to a specific standard not to be found elsewhere, the benefit conferred becomes fully appreciable by those who are called upon to aid justice in practical investigation. The microscope has, it is true, been latterly applied to aid in detecting the minute forms of various poisonous substances, but more especially as by Guy and Nelwig, in the results of sublimation, in both organic and inorganic substances. To this the author has added those produced by reagents in definite amount of solution, giving a precision to the results highly valuable to those who know the variations which are produced by alterations in the relations